

# Detection of *Candida vulvovaginitis* in Clinical Samples; Using Direct Polymerase Chain Reaction Without DNA Extraction

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**Background:** Vulvovaginal candidiasis (VVC) is a common disease which infects women. The current study investigated the performance of direct sample polymerase chain reaction (DS-PCR) method to detect *Candida* spp. in clinical samples of vulvovaginitis to compare the results to those of standard microbiological laboratory methods.

**Objectives:** The current study aimed to further simplify the DNA extraction procedure, and shorten the time required for isolation and identification by using direct PCR to identify *Candida vulvovaginitis* without DNA extraction from samples or colonies.

**Patients and Methods:** In the current study, totally 150 sexually active women participated. Vaginal discharge samples were collected using two sterile Dacron swabs that were immediately placed in two tubes each containing 1 mL of distilled water. One of the tubes was used for conventional culture methods whereas the other one was used for DS-PCR without DNA extraction. The number of yeast cells in each sample was counted.

**Results:** The results showed that out of the 150 samples, 55 were positive and 63 samples were negative by both methods, and 32 samples were positive using the culture method, but negative by DS-PCR. All positive DS-PCR samples had  $> 10^7$  yeast or conidia cells/mL. The sensitivity and specificity of DS-PCR were calculated as 63.2% and 100%, respectively.

**Conclusions:** Direct sample PCR has the potential to rapidly and accurately diagnose *Candida vulvovaginitis* in patients, especially if sufficient samples are obtained.

**Keywords:** Candida; Direct Sample PCR

## 1. Background

Vulvovaginal candidiasis (VVC) is a common disease which infects women and may affect their physical and emotional health, as well as relationships with their sexual partners. Conventional methods to identify *Candida* species are based on culture, assimilation, fermentation reactions, and morphology. However, these techniques are time-consuming and their reliance on phenotypic expression makes them potentially unreliable. To overcome the many limitations of phenotypic methods involve diagnosis of vulvovaginal candidiasis, recent advances in molecular DNA analysis have facilitated the development of identification systems at the species level (1). DNA isolation and purification is a key step for most protocols in molecular biological studies, including polymerase chain reaction (PCR). Various methods proposed that extraction and purification of yeast DNA can be classified according to the following cells lysis techniques: bead beating, enzymatic cell wall lyses using lyticase, or cell permeabilization using chaotropic agents. However, these techniques are generally very time-consuming. Moreover, some protocols require additional lyses steps, such as mechanical disruption and

sonication, or the use of toxic substances such as phenol-chloroform solution (2). In essence, these approaches are no faster than conventional approaches because first, the organism must be isolated in pure culture (3).

In contrast, a number of reports have described the PCR amplification of purified DNA extracted from clinical *Candida* specimens (2); however, the drawback to these approaches is the additional time for genomic DNA extraction required for the amplification of specific genes.

## 2. Objectives

The current study aimed to further simplify the DNA extraction procedure and shorten the time required for isolation in culture and identification by using direct PCR to identify *Candida vulvovaginitis* without DNA extraction.

## 3. Patients and Methods

### 3.1. Clinical Samples

One hundred and fifty cases examined for inclusion